# **Experimental Design Development**

**Before the Experiment**

1. State the problem.

2. What are the important variables for this problem? List as many as possible.

3. What hypotheses could you propose to address the problem? List them all.

4. Which hypothesis appears to be the most interesting?

5. Brainstorm, in your group, a list of ways you might test your favorite hypothesis.

6. From the list generated in #5, design an experiment to test one variable. List the materials needed and a step-by-step procedure in a numbered list similar to a recipe.

7. What will you measure or count? If you have not planned to measure or count something, you probably need to change your design.

8. How many samples will you test?

9. How many times will you test each sample?

*Note: combining 8 and 9, you must have a minimum of twelve measurements (for example, testing three samples, four times each).*

10. How will you incorporate one or more controls into your experiment?

**After the Experiment**

11. How can you show your results on a graph? Based on the type of data you collect, would a line graph or a bar graph be better?

12. What do you think your data mean? Do they prove or disprove your original hypothesis? Describe your conclusions.

13. How could you have improved the validity of your results? What would you do differently next time?

14. If you were continuing, would you need to do another experiment? Would you need to choose another hypothesis?